MEMORANDUM

TO: Interested Parties

From: Lou Harmon, Water and Wastewater Section, Program Manager

Date: September 29, 2011

RE: Chapter 12, Section 13 Finished Water Storage – Policy 14.13.3

1. Increasing the amount of time that water remains in the distribution and storage components of a public water supply result increased disinfection by products and decreased chlorine residual. Either of these effects may result in a violation of primary drinking water standards,
2. Chapter 12, Section 13, Finished Water Storage, does not address the need to manage the age of the water in storage. Many factors affect the length of time a particular gallon of water might be in storage.
    a. The percentage of the volume of water in the tank replaced in an average 24 hour period. For example, with optimum mixing, the age of the water in storage in days is Age = 100% / % 24 hour fill. If 20 % of the water is replaced in 24 hours, the least age possible is 5 days.
    b. The design of the storage vessel may allow zones of no or very little circulation. The zones of poor circulation change with the weather. This can result in water ages up to 3 or 4 times the average age of water in the vessel. The poorly circulated water may act as a reservoir for bacterial growth or cause problems when it is pulled into circulation during periods of higher flow.
    c. Operating the storage as near full as possible at all times creates problems with mixing and freezing. The more energy that is discharged into the storage vessel at one time, the more complete the mixing induced by the filling action.
3. All new or remodeled storage must have separate inlets and outlets with the inlet and outlet separated as widely as practical.
4. The design report must demonstrate that the storage will be operated for a minimum of 20% daily fill for surface water sources and 10% fill for ground water sources at all times including during the month of minimum use. If this is not possible due to small demand coupled with high fire storage requirements, an alternate plan to assure water quality must be presented in the design report.
5. If the storage has an average age of water greater than two days the storage has to be operated so that a minimum 25% fill occurs each time pumping is initiated with a minimum inlet velocity of 10 feet/second. If this is not possible, the storage must have designed passive or active mixing. Mixing designs must evaluate mixing at with inlet temperature colder than stored water, same as stored water and warmer than stored water.